WHAT IS CLAIMED IS:

1. An optical element designed for at least two wavelengths of red light and blue light, comprising a phase level difference, wherein a difference in optical path length occurring when the blue light passes through the phase level difference is five times the wavelength of the blue light.

2. An optical lens comprising a phase level difference, wherein blue light is condensed by the optical lens through a substrate having a thickness t1, red light is condensed by the optical lens through a substrate having a thickness t2, $t1 < t2$, and a difference in optical path length occurring when the blue light passes through the phase level difference is five times a wavelength of the blue light.

3. The optical lens according to claim 2, which is a refractive lens formed of two kinds of different materials.

4. The optical lens according to claim 2, further comprising a liquid crystal phase modulation element, wherein the blue light is condensed through the substrate having the thickness t1 and the red light is condensed through the substrate having the thickness t2 by electrically switching the liquid crystal phase modulation element, and an aberration due to a difference in substrate thickness is corrected by switching a phase modulation amount given to a transmission wavefront.

5. The optical lens according to claim 2, further comprising a hologram, wherein +2nd-order diffracted light is most strongly generated with respect to blue light and +1st-order diffracted light is most strongly generated with respect to red light by setting a height of a diffraction grating of the hologram, whereby an aberration due to a difference in substrate thickness is corrected.

6. An optical head apparatus, comprising:

the optical lens of claim 2;

a first laser light source for emitting blue light having a wavelength $\lambda 1$;

a second laser light source for emitting red light having a wavelength $\lambda 2$; and

a photodetector for receiving a light beam reflected from a recording surface of an optical information medium and outputting an electric signal in accordance with a light amount of the light beam,

wherein the optical lens condenses a first light beam from the first laser light source onto a recording surface of a first optical information medium through a substrate having a thickness t1, and condenses a second light beam from the second laser light source onto a recording surface of a second optical information medium through a substrate having a thickness t2.

7. The optical head apparatus according to claim 6, wherein when the second light beam is condensed onto the recording surface of the second optical information medium, a collimator lens for substantially collimating the second light beam is placed close to the second laser light source, whereby the second light beam formed into diffused light is allowed to be incident upon the optical lens, and a focal position on the second optical information medium side is placed away from the optical lens.

8. The optical head apparatus according to claim 6, wherein both light emission points of the first laser light source and the second laser light source are placed so as to have an image forming relationship with respect to a focal position on the optical information medium side of the optical lens, whereby a servo signal from a common photodetector is detected.

9. An optical information apparatus, comprising:

an optical head apparatus including the optical lens of claim 2 and a laser light source;

a motor for rotating an optical information medium; and

an electric circuit for receiving a signal obtained from the optical head apparatus, and controlling and driving at least one of the motor, the optical lens, and the laser light source based on the signal.

10. The optical information apparatus according to claim 9, wherein the laser light source includes a first laser light source for emitting blue light having a wavelength $\lambda 1$ and a second laser light source for emitting red light having a wavelength $\lambda 2$, and

the type of the optical information medium is determined, and a

collimator lens is moved to the second laser light source with respect to an optical information medium having a substrate thickness of about 0.6 mm.

11. A computer comprising:

the optical information apparatus of claim 9;

a computation apparatus for performing computation based on at least one of input information and information reproduced by the optical information apparatus; and

an output apparatus for outputting at least one of the input information, the information reproduced by the optical information apparatus, and a result obtained by the computation in the computation apparatus.

12. An optical information medium player comprising the optical information apparatus of claim 9, and a decoder for converting an information signal obtained by the optical information apparatus to an image.

13. A car navigation system comprising the optical information apparatus of claim 9, and a decoder for converting an information signal obtained by the optical information apparatus to an image.

14. An optical information medium recorder comprising the optical information apparatus of claim 9, and an encoder for converting image information to information to be recorded by the optical information apparatus.

15. An optical information medium server comprising the optical information apparatus of claim 9, and an input/output terminal for exchanging information with an outside.

16. An optical lens comprising a hologram, a refractive lens, and a phase level difference,

wherein the hologram includes a sawtooth shape grating having a sawtooth shape in cross-section, and generates +2nd–order diffracted light most strongly with respect to blue light and generates +1st–order diffracted light most strongly with respect to red light, by setting a height of the sawtooth shape grating, and

a difference in optical path length occurring when the blue light

passes through the phase level difference is five times a wavelength of the blue light.

17. The optical lens according to claim 16, wherein the height of the sawtooth shape grating is *h1*, and *h1* provides a difference in optical path length of about two wavelengths with respect the blue light.

18. The optical lens according to claim 16, wherein, in the hologram, a height of the sawtooth shape grating formed in an inner circumferential portion including an intersection with an optical axis of the hologram is *h2*, and *h2* provides a difference in optical path length of about one wavelength with respect to the red light.

19. The optical lens according to claim 16, wherein the sawtooth shape grating is formed in an inner circumferential portion at least including an intersection with an optical axis of the hologram, +2nd–order diffracted light of the blue light is condensed through a substrate having a thickness t1, +1st–order diffracted light of the red light passing through the inner circumferential portion is condensed through a substrate having a thickness t2, and $t1 < t2$.

20. The optical lens according to claim 19, wherein a sawtooth shape grating is further formed in an outer circumferential portion outside of the inner circumferential portion, a height of the sawtooth shape grating in the outer circumferential portion is *h3*, *h3* provides a difference in optical path length of about one wavelength with respect to the blue light, +1st–order diffracted light is generated most strongly with respect to the blue light and +1st–order diffracted light also is generated most strongly with respect to red light, in the outer circumferential portion.

21. The optical lens according to claim 16, wherein the blue light is condensed through a substrate having a thickness t1, and the hologram is formed into a convex lens type so as to reduce a change in focal length when a wavelength $\lambda 1$ of the blue light is changed, whereby the blue light is subjected to a convex lens function by the hologram.

22. The optical lens according to claim 16, wherein the blue light is

condensed through a substrate having a thickness t1 by the optical lens, the red light is condensed through a substrate having a thickness t2, t1 < t2, and

when the blue light is condensed through the substrate having a thickness t1, a convex lens function of the hologram is increased, compared with a case where the red light is condensed through the substrate having a thickness t2, and a focal position of the red light on the substrate side is placed farther away from the optical lens, compared with a focal position of the blue light on the substrate side.

23. The optical lens according to claim 16, wherein the blue light is condensed through a substrate having a thickness t1 by the optical lens, the red light is condensed through a substrate having a thickness t2, t1 < t2, and

when the red light is condensed through the substrate having a thickness t2, a convex lens function of the hologram is decreased, compared with a case where the blue light is condensed through the substrate having a thickness t1, and a focal position of the red light on the substrate side is placed farther away from the optical lens, compared with a focal position of the blue light on the substrate side.

24. The optical lens according to claim 16, wherein a grating cross-sectional shape of the hologram is a sawtooth shape having an inclined surface on an outer circumferential side of a substrate on which the hologram is formed.

25. The optical lens according to claim 16, wherein the hologram, the refractive lens, and the phase level difference are fixed integrally.

26. The optical lens according to claim 16, wherein the hologram is integrally formed on a surface of the refractive lens.

27. The optical lens according to claim 16, wherein the phase level difference is integrally formed on a surface of the refractive lens.

28. The optical lens according to claim 16, wherein an aberration occurring in a refractive lens, or a refractive lens and a hologram due to a change in wavelength is reduced by an aberration occurring in the phase level difference.

29. The optical lens according to claim 16, wherein assuming that a numerical aperture at which the blue light is condensed through a substrate having a thickness t1 is NAb, and a numerical aperture at which the red light is condensed through a substrate having a thickness t2 is NAr, $t1 < t2$ and $NAb > NAr$.

30. An optical head apparatus, comprising:

the optical lens of claim 16;

a first laser light source for emitting blue light having a wavelength $\lambda 1$;

a second laser light source for emitting red light having a wavelength $\lambda 2$; and

a photodetector for receiving a light beam reflected from a recording surface of an optical information medium and outputting an electric signal in accordance with a light amount of the light beam,

wherein the optical lens condenses a first light beam from the first laser light source onto a recording surface of a first optical information medium through a substrate having a thickness t1, and condenses a second light beam from the second laser light source onto a recording surface of a second optical information medium through a substrate having a thickness t2, and $t1 < t2$.

31. An optical information apparatus, comprising:

an optical head apparatus including the optical lens of claim 16 and a laser light source;

a motor for rotating an optical information medium; and

an electric circuit for receiving a signal obtained from the optical head apparatus, and controlling and driving at least one of the motor, the optical lens, and the laser light source based on the signal.

32. A computer comprising:

the optical information apparatus of claim 31;

a computation apparatus for performing computation based on at least one of input information and information reproduced by the optical information apparatus; and

an output apparatus for outputting at least one of the input information, the information reproduced by the optical information apparatus,

and a result obtained by the computation in the computation apparatus.

33. An optical information medium player comprising the optical information apparatus of claim 31, and a decoder for converting an information signal obtained by the optical information apparatus to an image.

34. A car navigation system comprising the optical information apparatus of claim 31, and a decoder for converting an information signal obtained by the optical information apparatus to an image.

35. An optical information medium recorder comprising the optical information apparatus of claim 31, and an encoder for converting image information to information to be recorded by the optical information apparatus.

36. An optical information medium server comprising the optical information apparatus of claim 31, and an input/output terminal for exchanging information with an outside.

37. An optical lens comprising a hologram, a refractive lens, and a phase level difference,

wherein the hologram generates +2nd–order diffracted light most strongly with respect to blue light and generates +1st–order diffracted light most strongly with respect to red light,

a hologram grating of the hologram is formed in an inner circumferential portion at least including an intersection with an optical axis of the hologram,

+2nd–order diffracted light of the blue light is condensed through a substrate having a thickness t1, and +1st–order diffracted light of the red light passing through the inner circumferential portion is condensed through a substrate having a thickness t2, and $t1 < t2$, and

a difference in optical path length occurring when the blue light passes through the phase level difference is five times a wavelength of the blue light.

38. The optical lens according to claim 9, wherein a hologram grating is further formed in an outer circumferential portion outside of the inner

circumferential portion,

the hologram grating in the outer circumferential portion is a sawtooth shape grating having a sawtooth shape in cross-section, a height of the sawtooth shape grating in the outer circumferential portion is $h3$, and $h3$ provides a difference in optical path length of about one wavelength with respect to the blue light, and

in the outer circumferential portion, +1st–order diffracted light is generated most strongly with respect to the blue light, and +1st–order diffracted light is generated most strongly with respect to the red light.

39. An optical head apparatus, comprising:

the optical lens of claim 37;

a first laser light source for emitting blue light having a wavelength $\lambda 1$;

a second laser light source for emitting red light having a wavelength $\lambda 2$; and

a photodetector for receiving a light beam reflected from a recording surface of an optical information medium and outputting an electric signal in accordance with a light amount of the light beam,

wherein the optical lens condenses the first light beam from the first laser light source onto a recording surface of a first optical information medium through a substrate having a thickness t1, and condenses the second light beam from the second laser light source onto a recording surface of a second optical information medium through a substrate having a thickness t2.

40. An optical lens designed for light having one wavelength, comprising a phase level difference, wherein a difference in optical path length occurring when the light passes through the phase level difference is an integral multiple of the wavelength of the light.

41. An optical head apparatus, comprising:

the optical lens of claim 40;

a laser light source for emitting a light beam; and

a photodetector for receiving the light beam reflected from a recording surface of an optical information medium and outputting an electric signal in accordance with a light amount of the light beam,

wherein the optical lens condenses the light beam from the laser light source onto a recording surface of the optical information medium through a substrate.